System Configuration Team Meeting

April 21, 2005
NOAA Fisheries Offices, Portland, OR

1. Greetings and Introductions.

Today's meeting was chaired by Bill Hevlin and facilitated by Donna Silverberg. Hevlin led a round of introductions and a review of today's agenda. The following is a summary (not a verbatim transcript) of the topics discussed and decisions made at this meeting. Anyone with questions or comments about these notes should contact Kathy Ceballos at 503/230-5420.

2. Update on Flood Control Review.

The Corps distributed a document titled "System Flood Control Review," dated April 21. Lonny Mettler provided an overview of this document, as well as the Corps management team that will be responsible for this project in the future. Mettler noted that the authority for this study came from RPA 35 in the 2000 FCRPS BiOp. There was a Congressional directive added to that RPA in 2003, which directed the Corps to examine its flood control strategies to see what, if anything, needed to be changed to benefit anadromous salmonids. The Corps has used a two-stage approach – a reconnaissance-level study and a feasibility study.

The issue we're trying to evaluate could ultimately lead to a significant federal action, which means we need to be able to document what we've done in a transparent manner, Mettler said. We need to identify a federal interest here, and need to formulate a set of actions to answer the objectives set forth. We also need to identify a non-federal cost-share sponsor. We need to develop a recon-level report, and an operational strategy.

The recon-level report is primarily an internal process to the Corps, Mettler said. The current status is that we have completed the initial part of the review, and have responded to comments. The next step is taking it out for regional review. That involves finding out who needs to review the report, including interested state, federal, tribal and Canadian entities. We will be making presentations to interested parties in the region, after which, in May, we will begin the regional review process. That doesn't necessarily mean a broad public process, but we need to discover the level of regional support for

this project – we need to be able to demonstrate that before we move on to the next phase.

Mettler went briefly through the assumptions included in the system flood control review paper:

1. Initiation of feasibility dependent on favorable agency review and Congressional notification
2. Biological benefits linked to obtaining flow objectives for fish
3. Feasibility alternatives will involve some change in reservoir regulation to include Canadian storage regulation
4. All authorized project uses will be fully considered when formulating alternatives
5. New flood control damage curves will need to be developed
6. Potential structural or operational modifications can be made at operating facilities or elsewhere in the basin to offset some if not all of the increased flood risk
7. Acceptable levels of flood control may need to be re-defined
8. A non-federal sponsor will be identified
9. Funding for conducting a feasibility study will be cost-shared through hydropower rate payer contributions
10. Proposed work is compatible with other ongoing efforts in the region
11. Feasibility study will be phased.

Mettler noted that, in this case, the Corps will not be seeking a non-federal partner, unless there is an entity that wishes to volunteer. He added that Congress directed the Corps to use Columbia River Fish Mitigation funding to conduct this study; that will continue to be the case in the future. We consider this to be a part of the FCRPS BiOp, and integral to ensuring that the FCRPS continues to avoid jeopardy, he said.

Under Phase I activities, first, we need to capture a full set of alternatives, Mettler said. That will include a lot of things that make sense, and some that don't. We need to find a way to bound those alternatives through some sort of selection process. We also need to bring the damage assessments, many of which were developed more than 30 years ago, into the present timeline. We are also looking at the current flow objectives, in an effort to understand, if we can't achieve those flow objectives all of the time, what does that mean? Are there enough biological benefits there to warrant continued federal investment? We need to do a better job of quantifying the biological benefits of flow, he said.

Finally, we come to costs and timeline, said Mettler. The total feasibility study cost is going to be about $30 million; the cost of the Phase I report is estimated at $8 million. Again, those funds will come through the CRFM program. The current timeline calls for submission of the reconnaissance-level report to Corps headquarters and Congress in July 2005; the project management plan will be completed by December 2005. The Phase I process will then be initiated in July 2006, with an interim Phase I

report due in June 2007. If the decision is made to move forward, we would initiate the Phase II report in August 2007; it would then be completed in December 2009.

In response to a question from Ron Boyce, Mettler reiterated that, in order to proceed to Phase I, the Corps will need to demonstrate strong regional support, due to the cost of this process. Boyce noted that, if the Corps plans to release the reconnaissance-level report to the region by late May, and plans to submit the completed report to headquarters and Congress by July, that doesn't allow much time for regional review, or for the mustering of regional support. The sooner you can get us that report, the better, Boyce said.

Will the recon-level report identify the potential benefits of modified flood control operations? Russ Kiefer asked. We're looking at a variety of flow and refill scenarios, Mettler replied; basically, the direction we're pursuing is that we believe we are identifying some actions that will allow us to meet the flow objectives the region has identified as beneficial; any benefits identified will tie back to an increased likelihood of meeting those objectives, not to specific increased numbers of fish that would survive.

Obviously cost-effectiveness will be a key part of the equation, Kiefer noted. Do you anticipate any additional research into the benefits of flow in conjunction with this report? John Kranda asked. I anticipate that some level of information-gathering will be necessary, but I couldn't tell you what the level of effort would be, Mettler replied. Likely, any additional research needed will be identified during Phase I, and conducted during Phase II.

In response to a question from Kim Fodrea, Mettler reiterated that it is the Corps' belief that there is no non-federal co-sponsor available for this project, but the Corps anticipates that there will be some cost-sharing by Northwest ratepayers. Mettler asked that any ideas the SCT may have as to who should participate in the review of the recon-level report should be communicated to John Kranda or Randy Chong. Hevlin suggested that it may be useful for the SCT and the other Regional Forum teams to convene a special meeting to review and discuss the recon-level report once it is made available in late May. Other participants noted that the Mid-Columbia PUDs, the Council, the tribes and others will certainly want to participate in the recon report review.

3. Ice Harbor RSW Preliminary Balloon Tag Results.

Tim Wick began by saying that the Ice Harbor balloon-tag test ended last Sunday. There were two release hoses for each location; in Bay 3, the mid-release point was 8 feet above spillway crest, while the deep release was 3 feet above spillway crest. For the RSW, deep was 1.5 feet above the weir crest and 3 feet upstream, the mid release was 5-6 feet above the weir crest. There were two test treatments for the RSW releases – with and without Bay 3 open. We wanted to see if there was any substantial difference in fish survival and injury during those two treatments, he said,

adding that control fish were released through the fish facility JBS outfall.

Wick emphasized that what he is presenting today are preliminary numbers. We saw high survival and clean (uninjured) fish rates all the way across for the mid-range releases – just under 98%. We saw significantly higher injury rates for the deep releases under both treatments – 84-85% "clean" fish, or injury rates in the 15-16% range. Marvin Shutters noted that the intent of this study was to provide a first look at RSW survival, to ensure that the new structure wasn't causing serious injury or survival concerns. In response to a question from Boyce, Wick noted that the Corps has always seen relatively high injury rates for deep-released fish at the Ice Harbor spillway – descaling, eye injuries etc.

The group devoted a few minutes of discussion to the details of the 2005 Ice Harbor balloon-tag test. Ultimately, Kiefer observed that there is nothing glaring in this report that would cause the region to back off of the planned RSW tests this year, although obviously care is needed in the location of the hose releases. Hevlin said that, for NMFS, this information raises some concerns. We need to take a cautious approach, he said – we're willing to assume that fish that approach the Ice Harbor RSW volitionally tend to avoid the weir crest, and travel through the RSW higher in the water column, but eventually, we're going to need to see some evidence to verify that assumption. Our willingness to support continued testing is predicated on eventually gathering that evidence, Hevlin said.

Shutters said the hydroacoustic evaluation will provide some information on the vertical and horizontal approach of fish to the RSW, but will not yield definitive information on depth of their passage over the weir crest. We know that's something we need to pay close attention to, he said. In response to a question from Bruce Suzumoto, Wick said yearling chinook were used in this test. Boyce added that the upcoming radio-tag test at Ice Harbor will provide bottom-line information on mortality for fish passing Ice Harbor – obviously, we need to continue the test this year and see how it goes. If we see problems, we'll address them, he said. In response to a question from Hevlin, Shutters said it should be possible to install a camera closer to the RSW crest to monitor vertical distribution either later this year or next year.

4. FFDRWG and SRWG Updates.

Mike Langeslay distributed notes from the most recent Portland District FFDRWG meeting. He updated the group on the following projects and operations:

- B2 FGE: funding has been found, and the Corps is continuing to move forward; the 1-in-12 model is being dismantled
- The Dalles configuration and operation plan – meeting scheduled for April 27 to go over the draft final report. The top alternatives have now been identified – BGS, spillway/sluiceway improvements if needed
- The Dalles spill operations – the current settings are performing well, with spill

averaging 39% of total river flow, despite wide daily flow fluctuations

- The Dalles BGS – a special FFDRWG was held to develop design criteria; the prototype test has been pushed out to 2007. FFDRWG is confident that a BGS is a better option at this project than an RSW, because of the way juvenile fish typically approach The Dalles.
- Bonneville spill volume – the gate calibration problems have now been corrected, and Bonneville is spilling the proper volumes
- John Day fishway improvements – FFDRWG supported initiating a study to look at how best to improve passage problems (timing) at John Day
- Sea lions at Bonneville – FFDRWG is developing a design for sea lion exclusion fence in front of the adult fishway entrance.

Shutters noted that an SRWG meeting in Portland on May 9 to review FY'06 study proposals would be a good place to discuss adult studies. Langeslay and Shutters touched on the topics discussed at the March 28 SRWG meeting:

- Joint district project passage studies review: April 28 at The Dalles Dam.
- Next Walla Walla District FFDRWG: May 11-12
- McNary forebay temperature study meeting/brainstorming session: May 10 in Walla Walla

5. FY'05 CRFM.

Kranda distributed the most recent FY'05 CRFM project priority spreadsheet, dated April 21. The current status is that, since October, we have added a number of line-items to the program; the most recent is the last on the list, Bonneville sea lion exclusion. Kranda said he doesn't yet have a firm cost estimate for this item, but the preliminary estimate he has heard is about $350,000. Kiefer noted that recordings of mammal-eating killer whales are available, and have been shown to be effective in repelling sea lions.

Any major changes to the spreadsheet since our last meeting? Boyce asked. The changes are all relatively minor, Kranda replied – for example, in line-item 52, the fall chinook tagging study, we've added $200,000. In response to a question from Tom Lorz, Shutters said the new add-on ("Turbine pressure balloon-tag test") will take place at McNary. And what's the status of all of these add-ons? Boyce asked. They are proceeding – again, the only recent add-on is the sea lion exclusion at Bonneville, Kranda replied. Boyce noted that it would be very helpful if the Corps could develop an electronic version of this spreadsheet, with hot-links to the most recent one-page study descriptions and workplans for each of these line-items. We're thinking about it, said Kranda – the challenge is keeping the one-pagers updated.

6. FY'06 CRFM Priorities.

Hevlin reminded the group that this topic has been on the last two SCT agendas; we need to start talking about our FY'06 priorities, and how we want to do the prioritization process this year, he said. Silverberg suggested that a brief written description of the various prioritization methods the SCT has employed in the past might be helpful. Kiefer said it makes sense, to him, to ask the Corps to develop a strawman FY'06 CRFM spreadsheet as a starting-point for SCT discussion. We have done that in the past, Kranda replied; my feeling is that the priorities are output-driven, and shouldn't change a lot from year to year – many line-items continue from year to year, and are driven by the priorities established in previous years. Perhaps at the next SCT meeting, the Corps can provide a list of the projects that are definitely going forward in FY'06, Lorz suggested – that will give us a sense of how much of the CRFM budget is already committed, and how much may be available for more discretionary projects.

7. Decision on Lower Monumental Spill Study.

Silverberg welcomed the Implementation Team members who joined the SCT for this agenda item. She reminded the group that, at the April 7 IT meeting, the final decision on the 2005 Lower Monumental spill study was deferred pending review and discussion within a technical/research subgroup to determine the statistical precision for the survival study, and the development of decision criteria by another subgroup of the IT.

IT chair Jim Ruff said that, in his recollection, this is the first joint SCT/IT meeting. The overall goal of the study agreed to at the April 7 IT meeting was to detect a survival effect of 3% survival difference between Bays 7 and 8 at Lower Monumental, and to investigate fish passage efficiency through Bays 7 and 8, he said. Another IT subgroup met on Monday to attempt to develop decision criteria for RSW installation at Lower Monumental, but we would like to hear from the technical workgroup first, Ruff said.

Hevlin distributed a document titled "Summary of LMO 2005 Study Options," the notes of the conference call of the joint IT/SRWG technical subgroup. Ruff noted that the purpose of the study was to use statistically sound data to determine relative survival between bays 7 and 8, and whether passage through bay 8 may be detrimental to survival. With that purpose and goal for the study in mind, what did you come up with? Ruff asked.

Hevlin provided a brief overview of the technical committee conference call notes, touching on the following major topics:

- Study design assumptions and limitations – that the integrity of the Ice Harbor study has priority over the Lower Monumental study; that the study will be designed to use the resources originally intended for the Lower Monumental project baseline study; that the maximum number of radio-tagged fish released per day is limited due to the number of tags that can be detected in the forebay at any one time (tag collision).

Hevlin said that no more than 90 radio tags can be detected in the forebay of a dam in any 24-hour period. And the USGS system has the same limitation? Lorz asked. Yes – it has to do with how many code sets you can listen to at the same time on the same frequency, Shutters replied.

Moving on, Hevlin touched on the original Lower Monumental/Ice Harbor study design, release plan and objectives. Next, he addressed the three study design modification options the subgroup considered:

- Option 1: shorten the duration of the study at Lower Monumental to less than 25 days. This method maintains the volitional release of 1,400 tagged fish above Lower Monumental, but for a shorter duration. Given the limit of 90 fish per day above Lower Monumental, spill duration is reduced (with a list of pros and cons)
- Option 2: increase the sample size released above Lower Monumental by 960 tags, originally programmed for the Ice Harbor direct RSW release pilot test of the triple release concept, to a release point upstream of Lower Monumental (with pros and cons)
- Variation of Option 2: increase the number of tags per day to the max (90 fish per day) and increase the duration of the spill period to try and increase precision. The example used was 10 days, which would increase the number of fish released by 1,540, at a cost of about $230,000 for the extra tags.
- Option 3: maintain the original number of upstream releases, or add the 980 fish from the direct release at Ice Harbor; conduct a direct release via a cannister or hose into spillbays 7 and 8. Fish would be released during a four-hour block of spill over the 25-day period (with a list of pros and cons)

With respect to the variation on Option 2, Hevlin noted that logistical problems with tag production and the impacts of overlapping runs on detection efficiencies and marking activities will make this alternative difficult to implement. Were we planning radio-tag studies at Lower Granite and Little Goose that might be available for use at Lower Monumental? Kiefer asked. Those tags are incompatible with the Lower Monumental system, Shutters replied.

With respect to the relative precision of the three study options, Hevlin directed the group's attention to Page 6 of his handout. He noted that there was unanimous support among the technical subgroup for moving the 960 fish from Ice Harbor to Lower Monumental. He provided a brief overview of the table on Page 6, which analyzed the relative precision of Option 2, noting that the four right-hand columns in this table estimate total spillway survival, survival by spillbay, and the relative survival between bays 7 and 8. The difference between the final two columns is in the power of detection – 50% vs. 80%. Typically, we would want to use the 80% power in a test of this sort, observed a NMFS representative.

The first table on Page 7 continues this table to show the relative precision of the variation on Option 2, with an additional 10 days of spill and 1,540 more tagged fish, said Hevlin. Another NMFS representative said that, according to the manufacturer, an additional 900 tags could be available by the end of May; the remaining 900 would not be available until mid-June. The current schedule for the test call for the last fish to be released on May 28. So conceivably, if we can get 900 more tags by the end of May, we could have continuity between the end of the scheduled test and the start of the additional test days? Boyce asked. My concern is that, by the beginning of June, typically the migration is over, said Ruff – we may not be able to collect enough fish to put all of the tags into.

So the numbers in the last column are the differences that would be detectable? Shutters asked. That's correct, the NOAA representative replied. Howard Schaller noted that, what this analysis tells him is that, at the 80% power, if the difference in survival between bays 7 and 8 is greater than 5%, after 25-28 days of spill, we'll be able to detect it. At the IT meeting, we talked about the ability to detect a 3% difference, Ruff noted. You have set up a hypothesis that the survival in bay 7 is greater than survival in bay 8, said Schaller; making sure you don't have a false positive would be a Type 2 error – that there was a difference in survival, but you weren't able to detect it.

The group devoted a few minutes of discussion to what this analysis actually says. Hevlin noted that one fundamental question is whether or not the 2005 Lower Monumental study would be comparable to other radio-tag studies that have attempted to answer similar questions in the past – we don't want to set a new standard here, he said. Shutters noted that the Ice Harbor radio-tag test was targeted at 4%, with a beta of 80%. Where would the break-off point on this table be, relative to the current regional precision standards? Bill Tweit asked. Basically, I would say that if a 5.3% difference in survival exists between bays 7 and 8, we would be able to detect it, said Shutters – the question is, does the region think a difference of that magnitude exists?

The discussion continued in this vein for some minutes. Ultimately, the discussion moved on to the IT decision subgroup's deliberations. Ruff distributed a document titled "Three Decision Pathways for Next Steps Related to lower Monumental's Proposed Removable Spillway Weir." This paper lays out three potential decision pathways:

- Proceed with the installation of the RSW at spill bay 8 without a study involving spill because of the low flows in the system this year. Instead, rely on information gathered at Ice Harbor and Lower Granite and existing data at Lower Monumental (there is no spill survival data for bay 8 since construction of the flow deflector) as the basis for the decision.
- Defer the study at Lower Monumental and the RSW decision to another year in which there is more confidence in the results of the study (considering river conditions and the number of radio-tagged fish available), the risks associated with the decision, and the economic costs/benefits are clearer.

- Move forward with the spill study at Lower Monumental this year using the following criteria to inform the next-step decisions for RSW installation once the study is completed: a) if passage survival at bays 7 and 8 are EQUAL and survival in bay 8 is greater than 95.5%, continue with RSW installation at bay 8; b) if passage survival at bay 7 is GREATER than bay 8, continue with the RSW installation in bay 8 only after further query: i. does bay 8 have a survival rate greater than 95.5% (i.e. better than the spill survival identified in the 2004 BiOp analysis)? ii. can survival at bay 8 be improved sufficiently with modifications? iii. is there a statistically significant difference in the survival rates at bays 7 and 8? What is the confidence level? c) if passage survival at bay 7 is LESS THAN survival at bay 8 AND bay 8 has survival greater than or equal to 95.5%, continue with RSW installation in bay 8.

So where does all of this leave us? Silverberg asked. With respect to how the 95.5% number was picked, said Rock Peters, the intent was to choose a solution that yields at least the survival called for in the BiOp analysis. The question is, how confident are we going to be in the data generated by this study? Right now, the level of imprecision we've heard described today doesn't leave me feeling very confident, Peters said. I think Rock has hit the nail on the head, said Bruce Suzumoto – until we find a way to generate greater precision, I'm not particularly confident in this evaluation either.

It sounds to me, then, as though Option 2 is being taken off the table, Silverberg said. Does anyone disagree? You could potentially get that tight precision through another technology, such as PIT tags, said Hevlin. Unfortunately, you would lose the fish behavior information generated by radio tags. There are other questions as well, such as, did we release the fish in the right position to mimic natural passage through the bay, Hevlin said. I look at the forebay behavior information as a bonus, though, said Fodrea – the real question is survival through Bays 7 and 8, and I wouldn't want us to trip over an element I would consider to be second-tier information.

The discussion continued in this vein for some minutes, as the group weighed the precision, quantity and usefulness of information that could be generated by a Lower Monumental spill test in 2005. Schaller said that, in his opinion, a 2005 study at Lower Monumental could have value. Jim Yost said Idaho's recommendation would be to install the RSW without a study. We know that the weir is going to improve things, he said; let's put it and, and next year, we'll have some other problem to worry about.

Bill Tweit said that, in Washington's view, a 2005 study could yield important information as to whether the recent modifications at Lower Monumental could negate some of the biological benefits of an RSW; he said Washington does see value in conducting a 25-day study this year. Shutters noted that hydraulic conditions will tend to be lower than normal in 2005, due to the low runoff year – in other words, due to the hydraulic conditions we expect to see in 2005, the results we get may not be representative of what we would expect to see once the RSW is actually installed.

Boyce said that, in Oregon's view, there would be value in a study going forward in 2005, particularly if any valid information could be gained about the relative survival through bays 7 and 8. Oregon would prefer to see the currently-planned RSW construction plan continue on schedule.

Bob Heinith said CRITFC concurs with Oregon's perspective; some information is better than none, and we should go forward and get the best information we can.

Fodrea said that, from a BPA perspective, it still isn't clear that the information that would be gained through a 2005 test is really critical to the RSW decision – it doesn't appear to me that the information we could gain this year will do much to inform that decision, and BPA would prefer to see RSW construction at Lower Monumental stay on track, she said.

Keith Kutchins said the Shoshone-Bannock tribes would prefer more caution in making a decision to install the RSW in Bay 8 – there is a chance that we could be hurting more fish than we're helping if we do that, he said. He said the note at the bottom of the decision pathways document deserves considerably more discussion – a regional cost/benefit discussion. There are serious questions about whether the cost of improving and operating the Lower Snake dams is really worth the benefits. Other than that, the Shoshone-Bannock Tribes agree with the CRITFC and Oregon positions on this issue, Kutchins said.

Ruff said NOAA Fisheries recognizes that many valid points have been raised at today's meeting. We view the installation of RSWs as a cornerstone of the BiOp and RPA; we, too, would like to keep the program on track and on schedule. Having said that, we are concerned about spending $15-20 million on an RSW that doesn't work, he said – I'm not sure the CRFM program could sustain that, given the level of "funding fatigue" we're seeing. I would prefer to spend a lesser amount on an "insurance policy;" I agree with Howard that there is useful information to be gained from a 2005 study. I also think Ron made a good point about the value of doing a study this year, particularly because the risk to the run at large is minimal in 2005, given the maximum transport strategy that will be employed this year, said Ruff.

Judi Danielson said she had nothing to add to Yost's remarks. Suzumoto said that, from a Council staff perspective, he wished that there was an opportunity to inject greater precision into this study. My concern is that the information that comes out of the kind of study we've discussed today could muddy the waters, rather than clarify them, he said. On the other hand, I'm concerned about constructing an RSW without more information, given the fact that it could be a detriment to the system. We would prefer to see some refinement to the precision estimates, if possible.

Fodrea said the operational cost, in terms of lost Bonneville revenues during a 25-day test, is about $4 million, assuming $51 per MW/h. While that is not the only issue, she said, it is an important issue.

Peters said that, from a Corps perspective, he really appreciates today's discussion – this is what the Regional Forum is all about. Given the low water year, and the potential for gathering information that wouldn't be very useful to the bay 7 vs. bay 8 decision – I think there is a very real chance that the information we gather this year could hurt our ability to make the right decision, not help it. The Corps does want that data, but we want the best data possible, in making decisions about RSWs, he said. Based on these various issues, I don't see that the kinds of data we'll see in 2005 at Lower Monumental will reflect what we need to move forward with our decision on the LoMo RSW. I think there may be other ways to get at the bay 8 vs bay 7 question – Hi-Z tags, for example, Peters said. I think we should consider a Hi-Z tag test if we're worried about injury rates, he said; the test as currently designed won't give us that information.

The Corps would like to stay on schedule, Peters continued. We believe Hi-Z turbine tag testing is necessary before we proceed with the Lower Monumental RSW decision. I also think the information on distribution and survival at Ice Harbor this year will be very useful for the Lower Monumental decision. So you would go ahead with that Hi-Z test this year? Heinith asked. As soon as possible, Peters replied – before we award a construction contract for the Lower Monumental. He added that, in the Corps' view, there is adequate fish behavior data available on which to make the Lower Monumental RSW decision; the injury data is the key missing piece.

Ultimately, the IT recommended that there were actually two tests be conducted at Lower Monumental this spring. The first will be a modification to the planned radio-tagged test; the second will be a balloon-tag study, designed to look at the direct injury rates of fish passing through bays 7 and 8. The radio telemetry study will begin on May 3, and will be designed to yield information on survival and fish behavior through bays 7 and 8. The study will require 8 Kcfs of spill through both bays 7 and 8, plus 2 Kcfs of training spill through bay 10, for three hours each test day. A total of 45 fish will be released via a hose 45 feet in front of each bay, 12 feet in depth, four fish at a time. A control group – 64 fish per day – will also be released 1 kilometer below the dam. NMFS estimated that this test design will allow the detection of a 3% difference in survival between bays 7 and 8.

With respect to the balloon tag study, it was uncertain, at today's meeting, whether or not it will be feasible this spring. It was agreed that, if possible, the balloon-tag study will begin as soon as the radio-tag study is finished, providing that it is still possible to collect the 1,000 or so fish needed for the study. The plan is to have two release locations in each bay – one shallow and one deep. The deep release location will represent the worst-case scenario, where the highest injury rates have been seen in the past. The goal of this study is to compare injury rates for fish passing through bays 7 and 8; the study is designed to detect a 5% difference in injury rates between the two bays.

8. Next SCT Meeting Date. The next meeting of the System Configuration Team was set for May 19 in Portland (not Ice Harbor). Meeting summary prepared by Jeff Kuechle.